

## **REMARKS**

### **Status of the Claims**

Claims **1-6, 8-30, and 32-48** were presented for examination. In the Office Action, claims **12** and **35** were objected to under 37 CFR 1.75(c) as being of improper dependent form. Claims **1, 2, 12, 14-27, 35** and **37-48** were rejected under 35 USC 103(a) as being unpatentable over U.S. Patent 6,801,565 to Bottomley, *et al*, ("Bottomley") in view of U.S. Patent 5,513,215 to Marchetto, *et al*, ("Marchetto"). Claim **3** was rejected under 35 USC 103(a) as being unpatentable over Bottomley in view of Marchetto in further view of Applicant's disclosed prior art (specifically P 0004). Claims **4-6, 8-11, 27-30, 32-34, and 36** were rejected under 35 USC 103(a) as being unpatentable over Bottomley in view of Marchetto in further view of U.S. Patent 6,067,292 to Huang, *et al*, ("Huang"). Applicant hereby amends claims **1, 5, 10-17, 20, 23, 27-29, 33-38, 40, 43** and **46** in this Response. Support for the claim amendments may be found throughout the Specification and, in particular, at least at ¶ **0037, 0038, 0089, EQ. 3, FIG. 2** and related discussions. Applicant respectfully submits that no new matter is added. Applicant cancels without prejudice claims **6-8, 18, 21, 24, 30-32, 39, 41, 44** and **47**. Upon entry of this Response, claims **1-5, 9-17, 19-20, 22, 23, 25-29, 33-38, 40, 42, 43, 45, 46, and 48** will be presented for examination.

Applicant hereby notifies the Examiner that broadening amendments have been made to claims **1, 14, 27** and **37**.

### **37 CFR 1.75(c) Objections: Claims 12 and 35**

Applicant's amendments to claims **1, 12, 27** and **35** now place dependent claims **12** and **35** in properly dependent form. Applicant respectfully requests that the objections to claims **12** and **35** be withdrawn.

### **35 USC 103(a) Rejections: Claims 1, 2, 12, 14-27, 35 and 37-48**

In the Office Action, the above-referenced claims were rejected under 35 USC 103(a) as allegedly unpatentable over Bottomley in view of Marchetto. In particular, the

Examiner states that Bottomley discloses a receiver having a bank of correlators that output a "vector of correlation values that indicate the level of correlation to each of the desired spreading sequences  $s_d$ ." The examiner also states that Marchetto discloses a correlating receiver for which "the covariance matrix of the output vector is shown in Col. 18, lines 7-19," and for which "each row of the covariance matrix is a permutation of the other rows of the matrix."

Applicant has canceled without prejudice claims **18, 21, 24, 39, 41, 44** and **47**.

Applicant respectfully notes that in Bottomley, the same spreading sequence  $s_d$  is used for all correlators (FIG. 4 and Col. 7, lines 26-42. Note the use of  $s(k)$ , "the spreading sequence.") Bottomley teaches that the correlation unit **410** "correlates delayed versions of the baseband signal  $r(k)$  to the desired spreading sequence  $s_d$ ." (Col. 6, lines 31-34.) This teaches away from Applicant's invention where plural signals,  $y_i(t)$  or  $h_i(t)$ , are correlated with the received signal  $r(t)$ . For Applicant's various embodiments using the signals  $h_i(t)$ , the signals are at least orthogonal. For Applicant's various embodiments using the signals  $y_i(t)$ , the transformed signals  $x_i(t)$  are substantially uncorrelated on at least a subspace as Applicant claims. Bottomley does not teach or suggest a receiver producing a first vector output and a second vector output wherein a correlation shaper transforms the first vector output into a second vector output and wherein the second vector output is substantially uncorrelated on at least a subspace and the transformation substantially minimizes a mean-squared-error relationship between the second vector output and first vector output, as Applicant claims. Therefore, it would not be obvious for one of ordinary skill in the art to use the teachings of Bottomley to arrive at the receiver and method as claimed in Applicant's claims **1** and **27**.

Marchetto does nothing to cure the deficiencies of Bottomley. Marchetto does not teach or suggest the use of a correlation shaper which produces a second vector output wherein the second vector output is substantially uncorrelated on at least a subspace and the transformation substantially minimizes a mean-squared-error relationship between the second vector output and first vector output, as claimed by Applicant.

Applicant respectfully notes that the matrix in Marchetto cited by the examiner at col. 18, lines 7-19 is not the covariance matrix of an output vector of a correlating unit of

the receiver as stated by the Examiner. Marchetto teaches the cited matrix is a covariance matrix of a vector [V] which represents channel impulse responses (CIR). (Col. 17, line 65; also col. 15, lines 59-67, col. 16, lines 1-5.) Applicant notes that Marchetto inconsistently refers to [V] at col. 17, line 62 as a “channel state vector.” A channel state vector was defined in EQS. 14 and 12. Applicant notes that [V] is later correlated with a channel state vector [U] defined at col. 17, line 56 to arrive at EQ. 22. Based upon the theoretical development, Applicant believes that [V] is a vector representing CIR estimates. In either case, [V] does not represent an output vector of a correlation unit as stated by the Examiner. Rather [V] represents functions which are multiplied by an input signal to provide an output vector. Further, the Marchetto teachings are directed to a single user on a communication system, wherein the single user may receive multiple distorted versions of a signal. Marchetto does not address the problem of multiple user signals being received by a user as occurs in a CDMA system, the problem addressed by the Applicant. It would not be obvious to one of ordinary skill in the art that the matrix of EQ. 23 and related teachings in Marchetto would have any bearing on the problem addressed and solved by the Applicant.

The above arguments are restated with full force and effect in response to rejections of subsequent dependent claims. The combination of Bottomley and Marchetto do not teach all the elements of Applicant's claims. For at least the above reasons, Applicant respectfully requests withdrawal of the rejections of claims **1, 2, 12, 14-17, 19-20, 22, 23, 25-27, 35, 37, 38, 40, 42, 43, 45, 46, and 48** to the extent they are maintained against the claims as amended.

35 USC 103(a) Rejections: Claims 3

In the Office Action, claim **3** was rejected under 35 USC 103(a) as allegedly unpatentable over Bottomley in view of Marchetto in further view of Applicant's disclosed prior art in paragraph **0004**. The above-stated arguments in relation to claims **1** and **27** are repeated with full force and effect. Applicant's disclosed prior art does nothing to cure the deficiencies of Bottomley and Marchetto. Applicant's disclosed prior art does not teach or suggest a correlation shaper which transforms a first vector output into a second vector output wherein the second vector output is uncorrelated on at least a

subspace and the transformation substantially minimizes a mean squared-error relationship between the second vector output and first vector output. For at least these reasons, Applicant respectfully requests withdrawal of the rejection of claim **3** to the extent the rejection is maintained against the claims as amended.

35 USC 103(a) Rejections: Claims 4-6, 8-11, 13, 28-30, 32-34 and 36

In the Office Action, the above-referenced claims were rejected under 35 USC 103(a) as allegedly unpatentable over Bottomley in view of Marchetto in further view of U.S. Patent 6,067,292 to Huang, *et al*, (“Huang”). In particular, the Examiner states that Huang discloses in claim **24** “the output of the processed received signal is processed again to minimize the mean square error of the demodulated CDMA signal.”

Applicant has canceled without prejudice claims **6, 8, 30, and 32**.

Applicant’s arguments with respect to Bottomley and Marchetto as stated above are repeated with full force and effect. Huang does nothing to cure the deficiencies of Bottomley and Marchetto. In particular Huang does not teach or suggest a correlation shaper which operatively transforms a first vector output into a second vector output wherein the second vector output is uncorrelated on at least a subspace and the transformation substantially minimizes a mean squared-error relationship between the second vector output and first vector output. Huang teaches of minimizing a mean square error of a demodulated output only, *i.e.*, one vector. (Claim **24** and EQ. 3.) Huang does not teach or suggest minimizing a mean squared-error relationship between a second vector output and a first vector output as applicant claims. Huang does not teach or suggest a transformation of a first vector output into a second vector output wherein the second vector output is uncorrelated on at least a subspace as Applicant claims. The combination of Bottomley, Marchetto and Huang do not teach or suggest all elements of Applicant’s claims. Therefore it would not be obvious for one of ordinary skill in the art to arrive at Applicant’s claimed inventions from the teachings of Bottomley, Marchetto and Huang.

For at least the above reasons, Applicant respectfully requests withdrawal of the rejections of claims **4, 5, 9-11, 13, 28, 29, 33, 34 and 36** to the extent the rejections are maintained against the claims as amended.

Conclusion

In view of the above, Applicant submits that presently pending claims **1-5, 9-17, 19-20, 22, 23, 25-29, 33-38, 40, 42, 43, 45, 46**, and **48** are in condition for allowance, and early indication thereof is respectfully requested.

Respectfully submitted,  
CHOATE, HALL & STEWART, LLP

Date: 3 January 2008

/Sam Pasternack/  
Sam Pasternack  
Registration No. 29,576

PATENT GROUP  
CHOATE, HALL & STEWART LLP  
Two International Place  
Boston, MA 02110  
Telephone: (617) 248-5000  
Facsimile: (617) 248-4000